

DASP-52016
8 Isolated D/I and &
8 Relay Output Card

User's Manual

Disclaimers

The information in this manual has been carefully checked and is believed to be accurate. Axiomtek Co., Ltd. assumes no responsibility for any infringements of patents or other rights of third parties which may result from its use.

Axiomtek assumes no responsibility for any inaccuracies that may be contained in this document. Axiomtek makes no commitment to update or to keep current the information contained in this manual.

Axiomtek reserves the right to make improvements to this document and/or product at any time and without notice.

No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Axiomtek Co., Ltd.

©Copyright 2004 by Axiomtek Co., Ltd.
All rights reserved.
September 2004, Version A1.0
Printed in Taiwan

ESD Precautions

Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.

Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This helps to discharge any static electricity on your body.

Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

Trademarks Acknowledgments

AXIOMTEK is a trademark of Axiomtek Co., Ltd.

IBM is a registered trademark of International Business Machines Corporation.

MS-DOS, and Windows 95/98/NT/2000 are trademarks of Microsoft Corporation.

Phoenix-Award is a trademark of Phoenix-Award Software, Inc.

IBM, PC/AT, PS/2, VGA are trademarks of International Business Machines Corporation.

Intel and Celeron, Pentium III are trademarks of Intel Corporation.

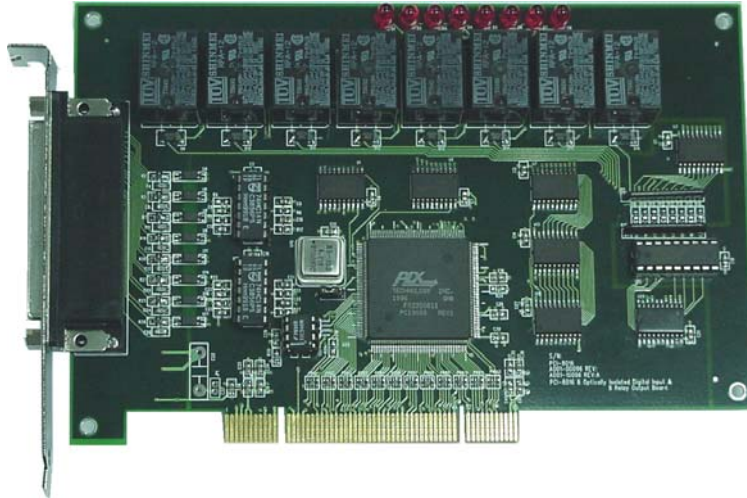
Other brand names and trademarks are the properties and registered brands of their respective owners.

Table of Contents

Chapter 1 Introduction.....	1
1.1 Features	2
1.2 Specifications.....	2
1.3 Accessories	4
Chapter 2 Hardware Installation	5
2.1 Board Layout.....	5
2.2 Signal Connections.....	6
2.2.1 Signal Connection Descriptions	6
2.3 Jumper Setting	9
2.4 DI/DO Circuits and Wiring	11
2.4.1 SPDT Relay: Single Pole Double Throw	11
2.4.2 Isolated Input: AC/DC Polarity-Free.....	11
2.5 Quick Setup and Test	12
Chapter 3 Registry Structure and Format.....	17
3.1 Overview	17
3.2 Relay Output.....	17
3.3 Isolated Input.....	18
Appendix A Dimension of DASP-52016 and Accessories	19

Chapter 1

Introduction



The DASP-52016 is a PCI-bus, eight isolated D/I and eight relay output card. It supports not only optical isolation (2500VDC) but over-voltage protection (50VDC) to enhance the reliability of the system. The DASP-52016 also supports two types of relay actuator-SPDT & SPST, making it suitable for controls and sensing applications such as load switching, external switching detection, and contact closure.

Board Identification- Serial Number on EEPROM

The DASP stores the serial number of each DASP in the EEPROM before shipping. The PCI scan utility can scan all the DASP and show users the serial number of each DASP, helping the user to easily identify and access each card during hardware configuration and software programming.

1.1 Features

- **8 optically isolated digital input channels**
- **4 SPDT & 4 SPST relay output channels**
- **On board relay status LED indicator**
- **AC/DC polarity-free isolated input**
- **Output status read-back**
- **Optical isolation on input channels (2500VDC) and**
- **Over-voltage protection (50VDC)**
- **Serial number on EEPROM supported**
- **Windows® 98/NT/2000/XP and Labview 6.0/7.0 driver supported**
- **Complete sample program- VB, VC, BCB, Delphi**

1.2 Specifications

Isolated Digital Inputs

- **Channels: 8**
- **Optical isolated: 2500VDC**
- **Photo-coupler: PC-3H4**
- **Photo-isolator response time: 20 μ s**
- **Over-voltage protect: 50 VDC**
- **Input voltage:**
 - **VIH (max.) 36VDC**
 - **VIH (min.) 4VDC**
 - **VIL (max.) 3VDC**
 - **Low Logic 0-3VDC**
 - **High Logic 4-36VDC**
- **Input current:**
 - **10 VDC 2.9mA (typical)**
 - **12 VDC 3.6mA (typical)**
 - **24 VDC 7.5mA (typical)**
 - **36 VDC 11.5mA (typical)**

Relay Outputs

- **Output channels: 8**
- **Relay type: 4 SPDT & 4 SPST**
- **Rating (resistive):**
 - 10 A @120 VAC, 6 A @ 250 VAC, 5 A @ 30 VDC
- **Relay on/off time: 10ms typical**
- **Max. switching power: 62.5VA ,60W**
- **Max. switching voltage: 250VAC,220VDC**
- **Breakdown voltage: 750 Vrms (1 sec)**
- **Operate time: 5ms**
- **Release time: 4ms**
- **Life expectancy:**
 - 10,000,000 operations

General Environment

- **I/O connector: 37-pin D-Sub type female**
- **Power consumption:**
 - +5 V @ 200 mA (typical)
 - +5 V @ 750 mA (max.)
- **Operation temperature: 0 ~ 60°C**
- **Storage temperature: -20 ~ 70°C**
- **Humidity: 0 to 90% non-condensing**
- **Dimensions: 185mm x 122mm**

1.3 Accessories

To make the DASP-52016 functionality complete, we carry a versatility of accessories for different user requirements in the following items:

- **Wiring Cable**

- **CB-89037-2:** 37-pin male D-sub type cable with 2m length
- **CB-89037-5:** 37-pin male D-sub type cable with 5m length

The shielded D-sub cable with 2m and 5m are designed for the DASP-52016 connector, respectively.

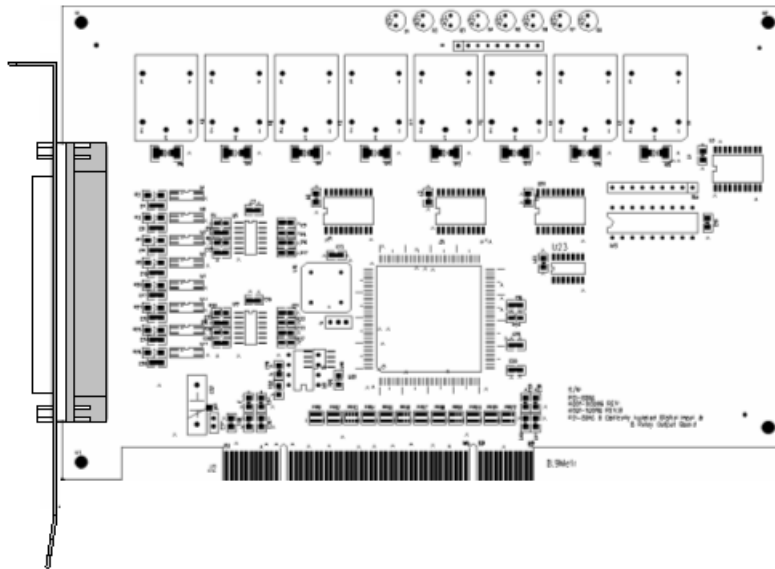
- **Terminal Block**

- **TB-88037:** D-sub 37P female terminal block with DIN-rail mounting

The terminal block is directly connected to I/O connector CON1 of the DASP-52016.

Chapter 2 Hardware Installation

2.1 Board Layout



Board Layout for DASP-52016

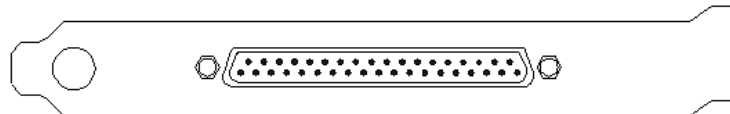
2.2 Signal Connections

2.2.1 Signal Connection Descriptions

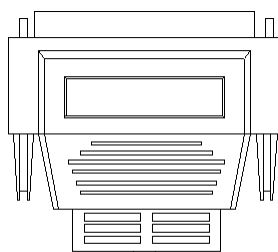


Signal Connections for DASP-52016

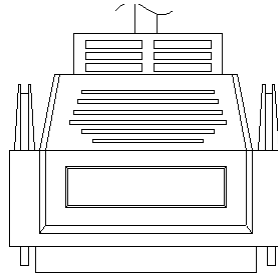
- **CON1:** The I/O connector CON1 on the DASP-52016 is a 37-pin D-sub female connector for digital input signals. CON1 enables you to connect to accessories, the terminal block TB-88037, with the shielded D-sub cable CB-89037-2 or CB-89037-5.
- Digital Input Connector CON1 and CON2



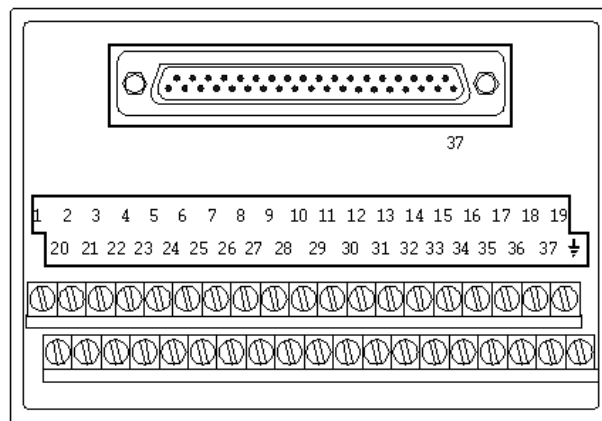
CON1



CB-89037

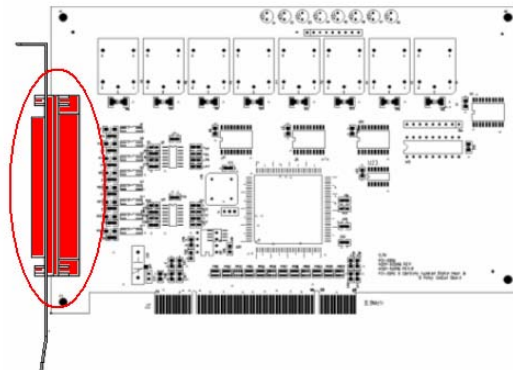


TB-88037



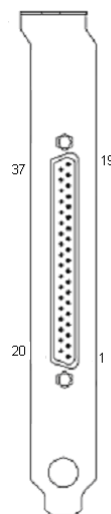
DIO Signal Connections for DASP-52016

The pin assignment of CON1 of DASP-52016 is listed as follows.



- D-Sub 37-pin Connector for DASP-52016 CON1

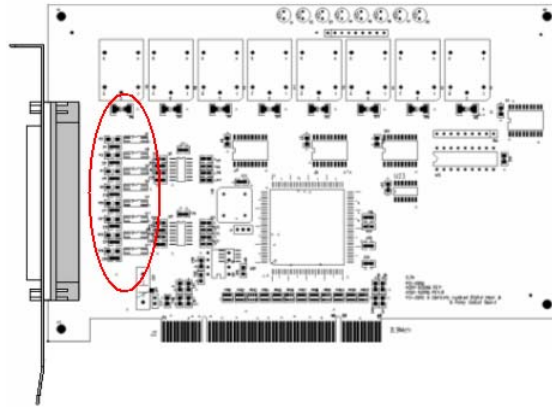
Pin	Description	Pin	Description
37	DIL_7	19	DIH_7
36	DIL_6	18	DIH_6
35	DIL_5	17	DIH_5
34	DIL_4	16	DIH_4
33	DIL_3	15	DIH_3
32	DIL_2	14	DIH_2
31	DIL_1	13	DIH_1
30	DIL_0	12	DIH_0
29	GND	11	COM_7
28	COM_6	10	NO_7
27	NO_6	9	NC_2
26	COM_5	8	COM_2
25	NO_5	7	NO_2
24	COM_4	6	NC_1
23	NO_4	5	COM_1
22	NC_3	4	NO_1
21	COM_3	3	NC_0
20	NO_3	2	COM_0
		1	NO_0



- NO n : normal open of the channel n
- GND: ground
- COM n : common of the channel n
- DI n H: digital input signal (+) of the channel n
- NC n : normal close of channel n
- DI n L: digital input signal (-) of the channel n

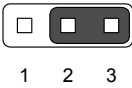
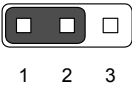
2.3 Jumper Setting

Each digital input channel of DASP-52016 can be configured to AC type or DC type independently. Jumper 1 ~ Jumper 8 relates DI0~DI7 as listed in the following table. When the AC input type of a specific channel is configured, the input path of the channel is automatically attached to an AC filter with a time constant of 1.2ms (60Hz low pass).



Jumper 0~7 of DASP-52016

Jumper	Channel
JP1	DI_0
JP2	DI_1
JP3	DI_2
JP4	DI_3
JP5	DI_4
JP6	DI_5
JP7	DI_6
JP8	DI_7



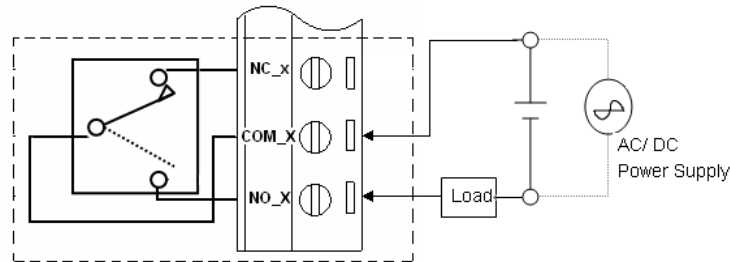
Jumper	DC signal input	AC signal input with filter
JPn	1-2	3-4

2.4 DI/DO Circuits and Wiring

The SPDT relay digital output and AC/DC free-polarity isolated digital input wiring diagrams and functional block diagrams of DASP-52016/ DASP-52032 are depicted as follows.

2.4.1 SPDT Relay: Single Pole Double Throw

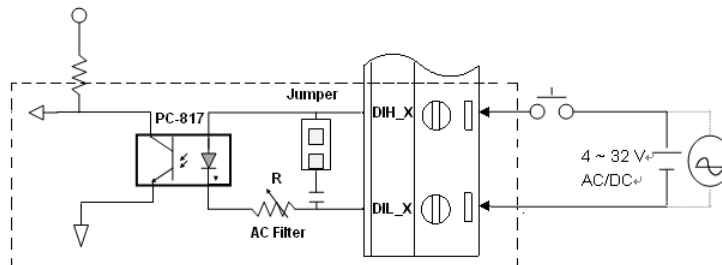
The contact rating of the relay output is 120V AC/10A, 250V AC/6A, and 30V DC/5A. The basic layout and wiring is presented as below.



Block Diagram of Internal Circuits and Wiring of SPDT Relay Digital Output for DASP-52016

2.4.2 Isolated Input: AC/DC Polarity-Free

The normal input voltage range is AC/DC 4-32V (AC 50-500 Hz). The basic layout is presented as below.



Block Diagram of Internal Circuits and Wiring of Isolated Digital Input for DASP-52016

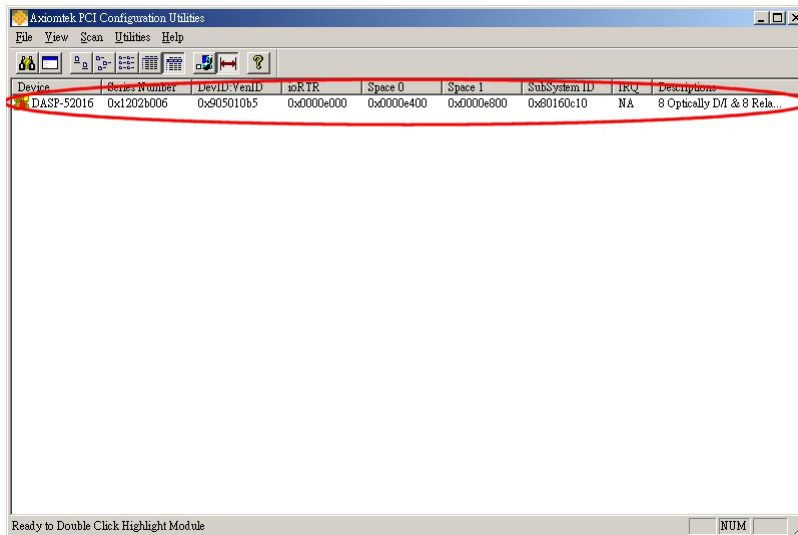
2.5 Quick Setup and Test

To install a new DASP-52016 into an IBM PC compatible computer, at first, power-off the PC and open its chassis, then plug the DASP-52016 into a PCI slot of mother-board. The DASP-52016 is a plug and play device for MS Windows, and the OS will detect your DASP-52016 after you power on the PC. The detail of driver and software installation is described in software manual of DASP-52016.

After the hardware and software installation, user can emulate and test DASP-52016 step by step as follows.

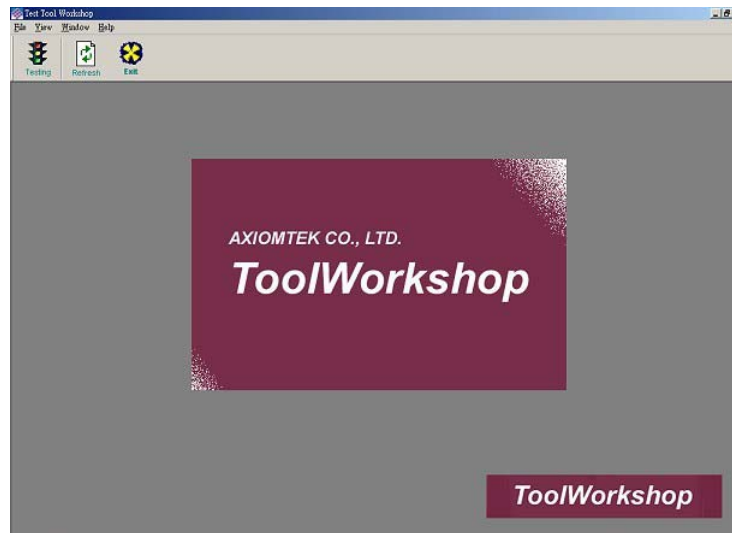
- **To perform a complete test of DASP-52016, we can route the input signals of DASP-52016 with a specific input pattern for read-back. And the output status of each channel can be observed directly from the on-board led indicator of each channel, or to estimate the mechanical movement of the SPDT relay of each channel. And then, by following the DASP-52016 test branch of the *ToolWorkShop* which will fully test all the digital I/O channels of the DASP-52016 as described in the following paragraphs.**

- Launch the '**PCI Configuration Utility**' of DASP-52016 to ensure that the resource of DASP-52016 is properly dispatched by the OS. Press the scan button in the toolbar of the '**PCI Configuration Utility**' to find the installed DASP-52016, and then check the resource list.

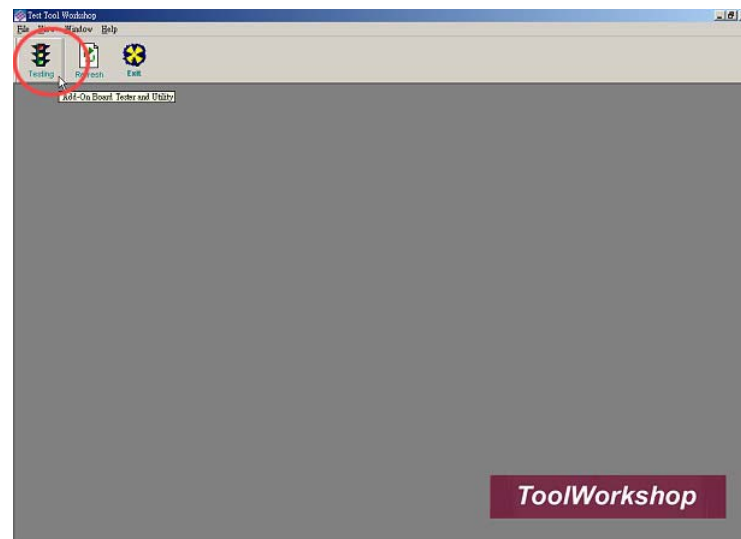


Scan DASP-52016 with PCI Configuration Utility and Check the Dispatched Resource

- **Exit the 'PCI Configuration Utility' and launch the 'ToolWorkShop' for DASP-52016.**

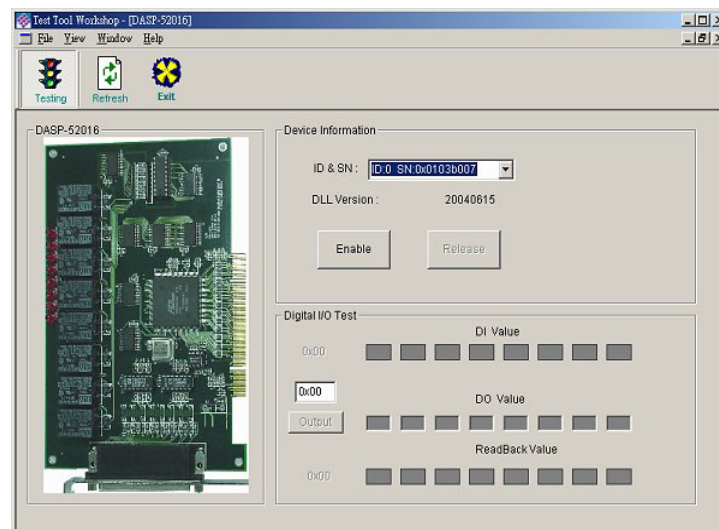
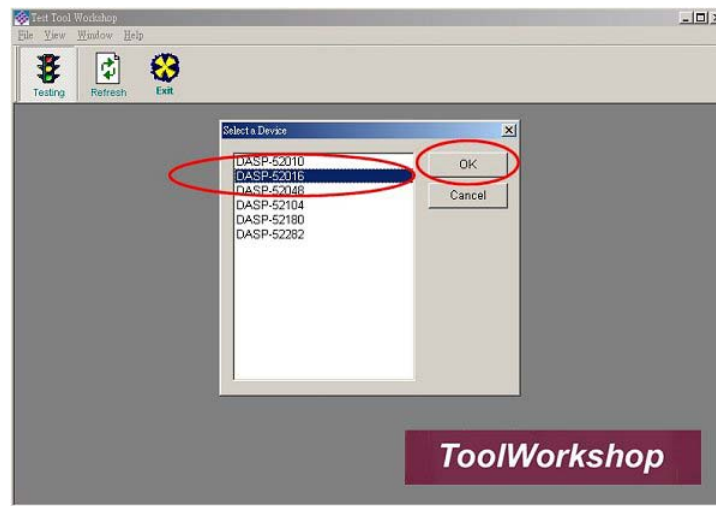


Launch ToolWorkShop

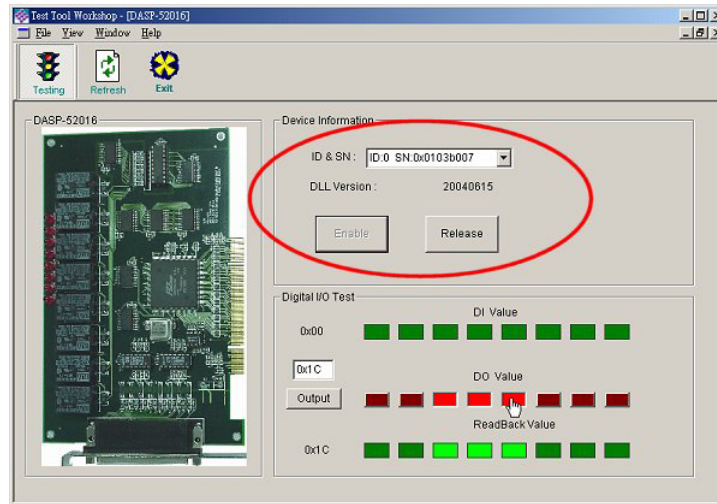


Select board test

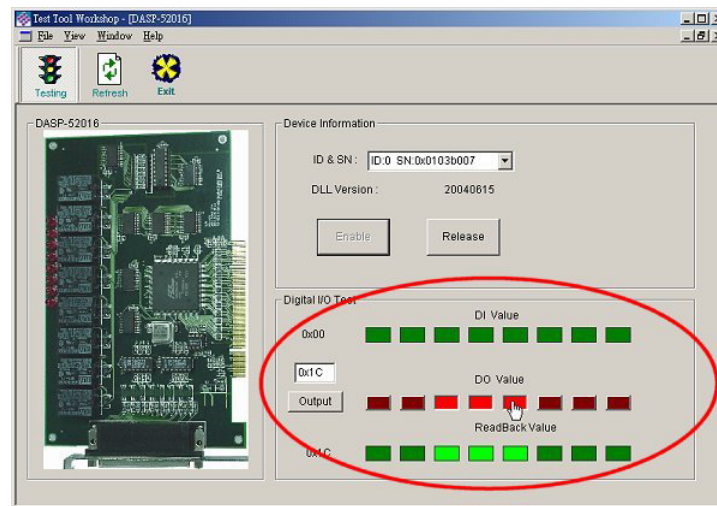
- **Perform Timer/Counter and DIO test of DASP-52016**



Select test target: DASP52016



Check Device Information and Press 'Enable' Button to Load DASP-52016 Library



Perform Digital Input/Output Test by Set the DO Port Value and Read Back the DI Port Value of DASP-52016

- Before exiting 'ToolWorkShop', press 'Release' button to release DASP-52016 library.

Chapter 3

Register Structure and Format

3.1 Overview

The DASP-52016 board occupies 4 consecutive I/O address. The address of each register is defined as the board's base address plus an offset. The I/O registers and their corresponding functions are listed in the followings.

Address	Write	Read
Base Address 0	PCI Bridge Configuration Registers in Memory Space	
Base Address 1	PCI Bridge Configuration Registers in I/O Space	
Base Address 2	Reserved	Readback of the output status
Base Address 3	Low byte	Low byte
	Relay output (CH0 ~ CH7)	Digital input (CH0~CH7)

3.2 Relay Output

The DASP-52016 provides 8 relay output. The low 8 bits (D0 - D7) of the relay 0 ~ 7 outputs are stored in base address 0. A high bit turns the relay on while a low bit turns the relay off. The 8 bits of relay output register are shown in the following.

- **Relay output: (Write)**

Base Address 3	D7	D6	D5	D4	D3	D2	D1	D0
Output Channel	7	6	5	4	3	2	1	0

- **Read back of relay output: (Read)**

Base Address 2	D7	D6	D5	D4	D3	D2	D1	D0
Read back Channel	7	6	5	4	3	2	1	0

3.3 Isolated Input

The DASP-52016 provides 8 digital input. The 8 bits (D0 - D7) of the digital inputs are stored in base address 3. A high bit represents a high state while a low bit represent a low state. The 8 bits of isolated input register are shown in the following.

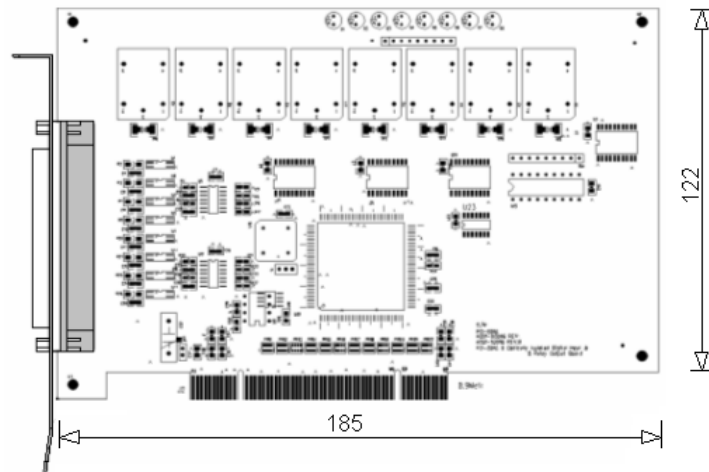
- **Relay input: (Read)**

Base Address 3	D7	D6	D5	D4	D3	D2	D1	D0
Input Channel	7	6	5	4	3	2	1	0

Appendix A

Dimension of DASP-52016 and Accessories

- **DASP-52016**



- **TB-88037**

